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School transition and mental health among adolescents: A comparative study of school systems in Denmark and Australia



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ABSTRACT

This study explores the influence of transition from primary to secondary schools in Australia versus no transition in Denmark by comparing age trends in students' school connectedness, emotional symptoms and conduct problems. Survey data from 5067 students in Australia and Denmark were used to compare 11–12 (prior to transition in Australia), 13–14 (during transition) and 15 year-olds (post-transition) in each country. In Australia, no statistically significant age group differences in emotional symptoms, conduct problems or school connectedness were observed. In Denmark, low school connectedness, emotional symptoms and conduct problems increased with age. A continuation of efforts to support students through transition and beyond in Australia, and a stronger focus on mental health and school connectedness in Denmark is recommended.

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1. Introduction

Most mental disorders begin during adolescence and early adulthood (10–24 years of age) and poor mental health is associated with negative educational, health and social outcomes (Patel, Flisher, Hetrick, & McGorry, 2007). It is therefore important to gain a better understanding of how different school systems may impact on mental health among adolescents. This paper focuses on emotional symptoms and conduct problems in two countries with differing school systems, Australia and Denmark. In Australia students transition from smaller primary to larger secondary schools in early adolescence, while students of the same age in Denmark usually remain within the same school and class of peers.

The mental health of young people is a growing public health issue (Patel et al., 2007). Social and emotional difficulties in childhood increase the risk of developing psychiatric disorders, depression, anxiety and substance use in later life (Costello, Egger, & Angold, 2005; Stansfeld, Clark, Rodgers, Caldwell, & Power, 2008), and it is therefore essential to promote positive

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social and emotional learning (OECD, 2015) and prevent mental health problems among children and adolescents (Viner et al., 2012). With respect to children and adolescents' mental health the World Health Organization states that "... an emphasis is placed on the developmental aspects, for instance, having a positive sense of identity, the ability to manage thoughts, emotions, as well as to build social relationships, and the aptitude to learn and to acquire education, ultimately enabling their full active participation in society" (WHO, 2013: 6). Much of the literature on mental health distinguishes between two dimensions: The hedonic dimension covering the way in which people feel about themselves and their life, and the eudaimonic dimension which is about the way in which people function in life (Huppert, 2014). In line with this, the present paper focuses on two aspects of mental health among adolescents: feeling (measured as emotional symptoms) and functioning (measured as conduct problems).

Children and adolescents' mental health is affected by family, peer, community, societal and cultural influences (Viner et al., 2012; Waters, Cross, & Runions, 2009; WHO, 2014). The socio-ecological model of mental health promotion stresses the interdependence of individuals, families, communities and societies, and recognizes that mental health is embedded in, and influenced by, a wider social, economic and cultural ecology (Barry, 2007; Zubrick & Kovess-Masfety, 2005). From this perspective mental health is seen as patterned by the settings where people live, work, play and learn. It is in these everyday settings that mental health can be promoted (Barry, 2007). School is a significant context for the promotion of positive mental health and prevention of mental health problems (Weare and Nind, 2011). However, there is a lack of knowledge on how different school systems affect mental health among adolescents, and cross-cultural studies may provide new insight.

One such difference in school systems is evident in Australian and Danish schools and relates to transition. In Australia, students transition from primary school to secondary school and are typically exposed to a new social and structural environment, whereas students in Denmark mostly remain in the same school and class all the way through primary and secondary school. Australian primary schools are typically smaller than secondary schools (approximately 200 students in total, maximum about 800 students) and the students usually learn in intact classes (approximately 25–30 students) throughout the day with one main teacher. During the transition to the larger secondary schools (approximately 550 students in total, maximum about 1850 students), which typically occurs when students are 12–13 years of age, students experience a new social environment with teachers, classrooms and classmates changing throughout the day. In Denmark, there is no transition from primary to secondary school as the public school system consists of an integrated primary and lower secondary school (average school size around 400 students) with one year of pre-school, nine years of primary and lower secondary education and an optional one-year 10th form (Danish Ministry of Education, 2016). The students are organized in classes with a maximum of 28 students at the same age, and they remain in the same class from preschool to year nine (Bjerg et al., 1995).

School transition in Australia marks a time of significant change for young people, as they adapt to a new social environment as well as increased responsibilities and greater emphasis on self-directed learning than occurs in primary school (Hanewald, 2013). Although some children cope positively with the upcoming challenges and opportunities (Lucey and Reay, 2000; Sirsch, 2003), for others it can be a time of anxiety and stress as they need to develop new friendships and define their place in a new social hierarchy (Pellegrini and Bartini, 2000). The transition period is also an especially vulnerable time as it coincides with developmental and socio-emotional changes associated with becoming adolescents (Hanewald, 2013) as well as with the onset of many depressive and anxiety disorders (Hankin and Abramson, 2001).

If mental health outcomes are impacted by school transition, or lack thereof, a possible protective factor may be students' school connectedness. Research from Australia and elsewhere has reported students experience a reduced sense of school connectedness and perceived quality of school life during the transition from primary to secondary school (Lester, Waters, & Cross, 2013; O'Brennan & Furlong, 2010; Pereira & Pooley, 2007). School connectedness has been defined, operationalized and measured in numerous ways using terms like school attachment, school bonding, school climate etc. (Libbey, 2004). It describes a student's feeling of relatedness to significant others at school and a general feeling of belonging at school (Lester et al., 2013; McNeely, Nonnemaker, & Blum, 2002; Rasmussen, Damsgaard, Holstein, Poulsen, & Due, 2005). Existing research indicates that school connectedness is an important protective factor for a number of adverse mental health and related outcomes like emotional distress (Lester and Cross, 2015; Resnick et al., 1997), depression (Mcgraw, Moore, Fuller, & Bates, 2008; Shochet, Dadds, Ham, & Montague, 2006), conduct problems (Loukas, Roalson, & Herrera, 2010), risk behaviour (Bond et al., 2007; Dornbusch, Erickson, Laird, & Wong, 2001) and suicidal ideation (Langille, Asbridge, Cragg, & Rasic, 2015; Resnick et al., 1997). Further, school connectedness is related to positive social and emotional development of children (Kidger, Araya, Donovan, & Gunnell, 2012; Lester et al., 2013; McNeely et al., 2002; Monahan, Oesterle, & Hawkind, 2010). Given this relationship between school connectedness and mental health outcomes (Langille et al., 2015; Lester et al., 2013; McNeely et al., 2002; Mcgraw et al., 2008; Monahan et al., 2010; Shochet et al., 2006), decreases in school connectedness resulting from school transition may be expected to impact on students' mental health.

The overall purpose of this comparative study is to explore how the structure of schooling offered during early adolescence may affect students' mental health. More specifically the aim is to assess the potential impact of transition from primary to secondary schooling by examining age trends in emotional symptoms, conduct problems and school connectedness among students in Australia and Denmark. Based on existing research it seems that, irrespective of school transition, connectedness to school may decline (Holstein et al., 2011; Klem & Connell, 2004; Loukas, Cance, & Batanova, 2013; Monahan et al., 2010) and mental health problems may increase from childhood to adolescence (Lawrence et al., 2015; Patel et al., 2007). Based on these developmental trends, and due to differences in the school systems in the two countries, we expected declines in connectedness and increases in mental health problems to be more marked in the Australian than

the Danish students. Hence we hypothesised that: 1) the odds of experiencing low school connectedness increase with a higher magnitude for Australian students after their transition from primary school to secondary school, than is the case for Danish students of the same age who largely remain in the same school and with the same peers; 2) the odds of experiencing emotional symptoms and 3) the odds of experiencing conduct problems increase at a higher rate in Australian students in the year following transition (as a direct result of the transition as well as decreased connectedness to school), than in Danish students of the same age.

2. Methods

2.1. Study population

The Australian data and sample were taken from the cross-sectional study Australian Covert Bullying Prevalence Study (ACBPS) conducted in 2007 (ACBPS, 2009). The study sampled students from across all the States and Territories of Australia utilising a two-stage probability design. In the total sample, the student response rate was 85%. Data from 2275 students from 103 schools were included in this study. Schools were randomly sampled (stratified by state, school sector and metropolitan/non-metropolitan location) and classes randomly selected within the schools. The hard copy self-report surveys were administered in the final term of the school year by school staff provided with a strict procedural and verbal protocol. Data were collected from students aged 9–15. The surveys were read aloud to the classes with students aged 12 years and younger. In 2007 the transition from primary to secondary school occurred either in grade seven or grade eight, dependent on the Australian State and school sector (Government or non-government).

Data from the Danish sample stem from The Health Behaviour in School-aged Children 2006 in Southern Denmark (HBSC 2006 Southern Denmark). HBSC 2006 Southern Denmark is a school-based cross-sectional questionnaire survey conducted in the region of Southern Denmark. The survey was part of a nationally representative survey conducted every fourth year constituting the Danish contribution to the cross-national Health Behaviour in School-aged Children (HBSC) survey (Currie, Nic Gabhainn, & Godeau, 2009). Self-administered hard copy questionnaires were completed by the students in the classroom during one lecture following a standardized introduction by the teacher. The student response rate was 90%. This study included 2792 Danish students in grade five, seven and nine (corresponding to the age groups 11, 13 and 15) in 25 schools.

2.2. Measures

Mental health was measured in both studies as emotional symptoms and conduct problems using two subscales of the self-report version of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). The SDQ is a widely used and well validated measure of social and emotional problems. It has been shown to be beneficial as a screening instrument for mental disorders in children and youth in both community and clinical samples (Reinholdt-Dunne et al., 2011). Each item gives a statement on feelings or behaviour (e.g. "I worry a lot") with response options: 'Not true', 'Somewhat true', 'Certainly true'. Each subscale comprised five items from which a total score ranging from 0 to 10 was derived. Based on the recommendations by the authors of the SDQ (SDQ info, 2016), we defined a high level of emotional symptoms as scores of 7–10 and a high level of conduct problems as scores of 5–10 on the respective scales. Scores in these high ranges are referred to in this paper as indicative of experiences of 'emotional symptoms' and 'conduct problems'.

The unidimensionality of the scales were assessed by fitting one-factor confirmatory factor analysis models, where a $CFI > 0.95$ and $RMSEA < 0.06$ indicate good and $RMSEA < 0.8$ adequate fit (Hu and Bentler, 1999; Steiger, 2007). A unidimensional factor structure of the scores in each country was supported for the conduct problems scale (Denmark: $RMSEA = 0.029$, $CFI = 0.990$; Australia: $RMSEA = 0.047$, $CFI = 0.989$) and less so, but still adequately for the emotional symptoms scale (Denmark: $RMSEA = 0.064$, $CFI = 0.977$; Australia: $RMSEA = 0.063$, $CFI = 0.986$). Measurement invariance of the scores from the two studies was also assessed and found not to hold. As recommended for categorical items, the invariance of the factor loadings and thresholds across countries were tested simultaneously in Mplus 7 (Muthen & Muthen, 1998–2009). The Satorra-Bentler scaled chi-square difference test (Muthen and Muthen, 2012; Muthen & Muthen, 1998–2009) and differences in the Comparative Fit Index (CFI) were utilized to compare the fit of the models assuming and not assuming parameter invariance (with a CFI difference > 0.002 indicative of a lack of measurement invariance) (Cheung & Rensvold, 2002). The factor structure was not invariant across country for either the emotional symptoms (Satorra-Bentler scaled chi-square difference test $TRd = 62.5$, $df = 14$, $p < 0.001$; CFI difference = 0.005) or conduct problems scales (Satorra-Bentler scaled chi-square difference test $TRd = 188.7$, $df = 14$, $p < 0.001$; CFI difference = 0.060).

In each of the two surveys, *school connectedness* was measured using three items. Items were examined and matched conceptually across the studies (Table 1). The Australian school connectedness measure comprised items adapted from the six item School Connectedness Scale (Resnick et al., 1997), and the Danish items have previously been used to measure school connectedness (Rasmussen et al., 2005). Correlations between the items ranged from 0.46 to 0.64 and from 0.52 to 0.65 for the Australian and Danish items respectively. Internal consistency reliability was sufficient in both samples (Table 1).

The indexes of school connectedness were dichotomized, and students were categorised with low school connectedness using the 20th percentile as a cut-off point in each country sample. This corresponds to a value of 3 on the mean score in both studies (cumulative percent of 16.6 in the Australian sample and 19.5 in the Danish sample). This choice of cut-off point was

Table 1

Items, response options, correlation coefficients and internal consistency for the country specific indexes of school connectedness.

	Items	Response options	Correlation ^a	Internal consistency ^b
Australian (ACBPS)	1. I feel close to people at this school	1 = 'Never' to 5 = 'Always'	0.46–0.64	0.81
	2. I feel like I am part of this school	1 = 'Never' to 5 = 'Always'		
	3. I am happy to be at this school'	1 = 'Never' to 5 = 'Always'		
Danish (HBSC)	1. Our school is a nice place to be	1 = 'Strongly disagree' to 5 = 'Strongly agree'	0.52–0.65	0.82
	2. I feel I belong at my school	1 = 'Strongly disagree' to 5 = 'Strongly agree'		
	3. How do you feel about school at present?	1 = 'I don't like it at all'		
		2 = 'I don't like it very much'		
		4 = 'I like it a bit'		
		5 = 'I like it a lot'		

^a Correlation between items (Spearman's rank correlation coefficients).^b Internal consistency (Cronbach's alpha).

based on conceptual considerations to categorise the group of students that feel disconnected from school. Sensitivity analyses were conducted based on 10%, 25% and 33% percentiles for low school connectedness, showing similar patterns of associations.

Age groups were constructed based on students' age and information on school year level and transition in the Australian sample, and school grade in the Danish sample. Only students within specific age ranges (11–15 years old) from each study were included in the analysis to enhance comparability of the Australian and Danish data. Three age groups were compared: children aged 11–12 years (prior to transition), aged 13–14 years (during the transition year) and aged 15 years (post-transition).

2.3. Statistical analyses

2.3.1. Approach to analyses

Before testing the hypotheses, the association between mental health (emotional symptoms and conduct problems) and school connectedness in each country sample was determined by conducting logistic regression analysis adjusting for gender. To test the study hypotheses, trends in emotional symptoms, conduct problems and school connectedness, across the three age groups (corresponding with pre-transition, transition and post-transition in the Australian data) were investigated within each country. Direct statistical tests of differences between countries were not conducted as the variable values may not be comparable since responses to the SDQ items were found not to be measurement invariant between countries (possibly as a result of cultural factors and differences in interpretation of the items (Goodman et al., 2012)) and due to differences in the school connectedness items in the two studies. Finally, we explored whether transition may impact to a greater or lesser degree on mental health for girls than boys, i.e. whether a particular sex was more at risk due to transition to secondary school, by repeating the analyses testing the study hypotheses within each gender group.

2.3.2. Statistical models

Random coefficients logistic regression analyses were conducted using the xtlogit procedure in Stata 12. Models were fitted to the data from each study to test for age group differences per country. The analyses included random coefficients to account for school-level clustering in the Australian data (where students typically move between class groups and teachers during the school day) and class-level clustering in the Danish data (as these intraclass correlations were stronger than the school-level ICC's). All models included gender as a main effect.

2.4. Ethics

Ethical approval for the Australian ACBPS study was obtained from the Research Ethics Committee at Edith Cowan University and the relevant educational authorities within each Australian State and sector. Students were informed that their participation was voluntary and parental consent was obtained prior to the surveys (consent rate 62%), which were completed anonymously (student completion rate 85%). In Denmark, there is no agency for ethical approval of population based surveys. Invitations to participate in the survey were sent to each school's management, school board (parents' representative) and student board (students' representative). The students were informed that participation was voluntary and that the study was anonymous as data about the students' name, birthday or other personal identification were not collected. The study is registered by the Danish Data Protection Authority.

3. Results

Data from 2792 students from a total of 25 schools in Denmark and 2275 students in 103 schools in Australia (1237 students in 55 primary schools and 1038 students in 48 secondary schools) were included in this study (Table 2).

Table 2
Numbers of schools and students.

n	Age (years)	Denmark		Australia		Total
		Schools ^a /Classes	Students	Schools ^b	Students	
Group 1	11		631 (70.8%)		617 (49.9%)	
	12		260 (29.2%)		620 (50.1%)	
	Total	23/50	891	55 primary	1237	2128
Group 2	13		821 (68.0%)		524 (90.0%)	
	14		386 (32.0%)		58 (10.0%)	
	Total	22/63	1207	29 secondary	582	1789
Group 3	15		694 (100%)		456 (100%)	
	Total	25/62	694	46 secondary	456	1150
Total		25	2792	103	2275	5067

^a In the Danish sample, school numbers are not 25 in each group as some of the schools' samples do not include students within the two younger age groups.

^b In the Australian sample, the primary and secondary school numbers do not add to 103 as some of the secondary schools' samples do not include students within the two older age groups.

3.1. Association between mental health and school connectedness

The results from the logistic regression analysis showed an association between school connectedness and emotional symptoms and conduct problems, respectively, in each country (not fully reported here, details available on request). Experiencing low connectedness to school was associated with higher odds of elevated emotional symptoms for Australian students ($OR = 4.18$, 95% CI 2.92–5.98) and for Danish students ($OR = 3.49$, 95% CI 2.50–4.86) compared to students with higher levels of school connectedness. Similarly, low school connectedness was associated with higher odds of conduct problems for students in Australia ($OR = 3.30$, 95% CI 2.51–4.35) and in Denmark ($OR = 5.05$, 95% CI 3.69–6.92).

3.2. School connectedness

In the Danish sample, the prevalence of low school connectedness increased with age from 10.2% among 11–12 year old students to 31.0% among 15 year old students (Table 3). This corresponds to odds ratios of 1.8 and above (Table 4). Each of these increases in odds across the age groups was statistically significant ($p < 0.001$). In the Australian sample, the prevalence of low school connectedness was slightly higher (19.3%) in the transition year (13–14 years) than in the younger and the older age groups (15.4%–16.4%), but the differences were not statistically significant ($p = 0.149$) (Table 3).

Table 3
Prevalence of low school connectedness, emotional symptoms and conduct problems by age group and country.

Dependent variable	Denmark % (n)	Total (n)	Australia % (n)	Total (n)
Low school connectedness				
11–12 years ^a	10.2% (90)	885	15.4% (178)	1155
13–14 years ^a	19.9% (238)	1197	19.3% (106)	549
15 years ^a	31.0% (214)	691	16.4% (72)	440
Total	19.5% (542)	2773	16.6% (356)	2144
Emotional symptoms				
11–12 years ^a	4.6% (40)	879	6.0% (69)	1154
13–14 years ^a	5.9% (69)	1178	6.8% (37)	546
15 years ^a	8.2% (56)	686	8.6% (38)	441
Total	6.0% (165)	2743	6.7% (144)	2141
Conduct Problems				
11–12 years ^a	4.4% (39)	879	12.0% (138)	1152
13–14 years ^a	7.9% (94)	1186	11.5% (63)	547
15 years ^a	8.3% (57)	690	12.2% (54)	441
Total	6.9% (190)	2755	11.9% (255)	2140

^a For Australian students age groups correspond to different transition phases: 11–12 years (before transition), 13–14 years (during transition) and 15 years (after transition).

Table 4

Odds ratios and 95% CI for low school connectedness, emotional symptoms and conduct problems by age group and country.

Low school connectedness	Denmark			Australia		
	n = 2773			n = 2139		
	Model 1: Age group main effect Chi(2) = 72.1, $p < 0.001$			Model 2: Age group main effect Chi(2) = 3.7, $p = 0.149$		
	OR	95% CI	P value	OR	95% CI	P value
13–14 years/11–12 years ^a	2.28 ^{**}	1.66–3.13	<0.001	1.37	1.00–1.86	0.053
15 years/13–14 years ^a	1.81 ^{**}	1.38–2.38	<0.001	0.81	0.57–1.15	0.241
15 years/11–12 years ^a	4.13 ^{**}	2.98–5.74	<0.001	1.11	0.79–1.56	0.555
	(ICC = 0.083, 95% CI: 0.052, 0.131)			(ICC = 0.038, 95% CI: 0.017, 0.082)		
Emotional symptoms	Denmark			Australia		
	n = 2775			n = 2150		
	Model 3: Age group main effect Chi (2) = 8.3, $p = 0.016$			Model 4: Age group main effect Chi (2) = 3.6, $p = 0.170$		
	OR	95% CI	P value	OR	95% CI	P value
13–14 years/11–12 years ^a	1.30	0.85–1.98	0.220	1.08	0.71–1.65	0.705
15 years/13–14 years ^a	1.45	0.99–2.14	0.060	1.37	0.85–2.20	0.199
15 years/11–12 years ^a	1.89 ^{**}	1.22–2.94	0.005	1.48	0.98–2.24	0.063
	(ICC = 0.026, 95% CI: 0.001, 0.379)			(ICC = 0.007, 95% CI 0.001, 0.038)		
Conduct problems	Denmark			Australia		
	n = 2775			n = 2148		
	Model 5: Age group main effect Chi (2) = 9.5, $p = 0.009$			Model 6: Age group main effect Chi (2) = 0.1, $p = 0.974$		
	OR	95% CI	P value	OR	95% CI	P value
13–14 years/11–12 years ^a	1.80 ^{**}	1.22–2.68	0.003	1.02	0.71–1.45	0.935
15 years/13–14 years ^a	0.98	0.68–1.41	0.904	1.03	0.68–1.55	0.891
15 years/11–12 years ^a	1.76 [*]	1.14–2.72	0.011	1.04	0.72–1.51	0.817
	(ICC = 0.032, 95% CI: 0.003, 0.244)			(ICC = 0.025, 95% CI: 0.004, 0.133)		

^a For Australian students age groups correspond to different transition phases: 11–12 years (before transition), 13–14 years (during transition) and 15 years (after transition).

^{*} $p < 0.05$.

^{**} $p < 0.01$.

3.3. Emotional symptoms

The prevalence of emotional symptoms increased with age in both countries (Table 3). However, age differences were only significant for Danish students ($p = 0.016$). The odds of experiencing emotional symptoms were highest among 15 year old Danish students compared to the youngest students ($OR = 1.89$, 95% CI 1.22–2.95) (Table 4).

3.4. Conduct problems

The prevalence of conduct problems seemed to increase with age in the Danish sample, from 4.4% among 11–12 year olds to 8.3% among 15 year olds (Table 3). In the Australian sample the prevalence was 12% for all age groups. The country-specific model showed that in the Danish sample, both the middle ($OR = 1.80$, 95% CI 1.22–2.68) and older age group ($OR = 1.76$, 95% CI 1.14–2.72) had increased odds of conduct problems compared with the youngest age group (Table 4).

3.5. Gender differences

The same conclusions may be drawn based on the gender-specific analyses for the Australian students as were for the overall samples, namely no evidence was found of a decrease in feelings of school connectedness, or an increase in emotional symptoms or conduct problems within the transition year for Australian male or female students (not fully reported here, details available on request). In the Danish sample the increased odds of emotional symptoms in the oldest vs the youngest age group were due to increased prevalence among girls ($OR = 2.11$, 95% CI 1.29–3.47), while no differences were found between age groups for the boys ($p = 0.302$). Furthermore, differences in conduct problems in the Danish sample were a consequence of increased odds amongst the boys in the 13–14 year old group ($OR = 2.12$, 95% CI 1.30–3.47) and the 15 year old group ($OR = 2.54$, 95% CI 1.50–4.30) compared with the youngest boys.

3.6. Missing data

Within the total sample ($n=5067$) data were missing on one or more of the mental health items for 139 students (Denmark $n=18$, Australia $n=121$) and missing for the school connectedness mean score for 150 students (Denmark $n=19$, Australia $n=131$), who were subsequently excluded from the analysis for the particular dependent variable. Logistic regression analyses, conducted to determine factors associated with having missing responses on the dependent variables, indicated age and sex were not associated with missing status on either the mental health or school connectedness scores. Missing responses to the mental health items were associated with low school connectedness scores ($OR=2.32$, 95% CI 1.32–4.06) and missing responses to the school connectedness items were associated with conduct problems ($OR=1.96$, 95% CI 1.00–3.85), but not with emotional symptoms ($OR=0.93$, 95% CI 0.33–2.66). Thus, the samples on which the analyses were based may be biased toward students with higher school connectedness and fewer conduct problems.

3.7. Robustness of results

There were no substantive differences in the conclusions drawn based on linear regression modelling of the three dependent variable mean scores as continuous outcomes and the logistic regression results reported above. Sensitivity analyses using different cut-offs for the school connectedness scores similarly indicated no substantive differences in findings.

4. Discussion

This study comparing trends in self-reported mental health outcomes in Australian and Danish adolescents did not support the hypotheses that, in contrast to students in Denmark who primarily remain in intact school classes until age 15 with no transition to new schools, Australian students would experience markedly negative mental health outcomes following transition into larger schools at the age of 12–13. Similarly, the findings did not support the hypothesis that in the Australian sample feelings of connectedness to school would be significantly lower following transition.

As expected based on previous research (e.g. [Lawrence et al., 2015](#); [Lester & Cross, 2015](#); [Patel et al., 2007](#)), developmental changes were observed in the Danish sample, where emotional symptoms and conduct problems increased with age. Increases in emotional symptoms were also observed in the Australian sample, although these were not statistically significant. Unexpectedly, no age group differences in the levels of conduct problems were found among the Australian students. However, the prevalence of conduct problems was relatively high among Australian students in all age groups, which may suggest a possible ceiling effect as a partial explanation of no age-related increase. Importantly, however, the “spikes” in the prevalence of mental health symptoms expected in the transition year in the Australian sample were not evident.

The percentage of Danish youth with low connectedness to their school increased steadily across the age groups, with an approximately two-fold increase in odds of being disconnected in each subsequent age group. This finding is in line with previous studies on school connectedness in Denmark ([Holstein et al., 2011](#)), in other countries ([Klem and Connell, 2004](#); [Loukas, Suzuki, & Horton, 2016](#); [Monahan et al., 2010](#)) and in a previous Australian study among 1800 students aged 11–14 years in 11 schools from one Australian state ([Lester and Cross, 2015](#)). This latter study reported a steady decline in each subsequent year from the last year of primary school to the end of the second year of secondary school in mean scores of school connectedness (measured using a four item scale, including the three items in this study, adapted from the [Resnick et al., 1997](#) School Connectedness Scale). In contrast, in this study including data from 103 schools across all Australian states, the prevalence of disconnected Australian students remained fairly similar across the age groups, with only slightly elevated odds of 1.37 ($p=0.053$) in the transition year.

4.1. Interpretations

The findings did not support the hypotheses that transition in the Australian school system would have an impact on students' socio-emotional outcomes. One possible explanation could be that Australian schools have invested in providing support to students as they move to secondary schools and thus have a school system that is somewhat adapted towards the needs of students in the transition year. In contrast, the Danish school system does not have a special focus on strengthening or promoting school connectedness among the oldest students. In both countries, a strong association between low school connectedness and higher odds for emotional symptoms and conduct problems was observed. The relatively high prevalence of students with low school connectedness in the older age groups relative to the youngest in the Danish sample, may therefore, partially explain the higher prevalence of emotional symptoms and conduct problems in particularly the oldest age group.

Adolescence is characterized by physical, psychological and social changes in which the reciprocal exchanges between the young person and the social context play an important role ([Due et al., 2011](#)). During puberty adolescents naturally begin to disconnect from family and focus more on peer connectedness. In the Australian school system, the move to a larger secondary school gives adolescents opportunities to make new friends from a larger pool of young people and hence find a peer group of like-minded friends with similar interests. The transition to secondary school can also be seen as a step into

being more responsible and autonomous e.g. parents are often involved in primary school activities but much less so in secondary schools (Lester et al., 2013). In the Danish school system, students remain in the same class with the same classmates with the intention of creating a safe and trustful school class environment. However, for students that do not fit in with the other classmates there is no “second chance” to be part of a new peer group or have new classmates in this school system (Gilliam, 2014). This may be a further explanation for the observed increase in adverse mental health outcomes amongst the Danish students and the lack of a substantive increase in emotional symptoms and conduct problems among Australian students.

It is important to also allow for cultural differences in the two countries when interpreting these findings. Besides differences in school system, other factors will impact on students' mental health, e.g. differences in parenting styles, youth culture, norms of academic achievement etc. Unfortunately, it was not possible to account for these in this study.

4.2. Strengths and limitations

This study has several strengths. The originality of the study is the focus on how different school systems may affect school connectedness and mental health among adolescents. To our knowledge, this is the first study to examine age trends in school connectedness, emotional symptoms and conduct problems among Danish and Australian students. It includes large representative samples at similar ages from two countries with quite different school structures.

The study also has several limitations. The main limitation is the cross-sectional design which impedes causal interpretation. This study also relies only on self-reported data, although these data are considered to hold the most valid information when studying subjective feelings like mental health of adolescents. Another limitation is differences in the age distributions within the age groups which may partly explain the differing trends between the two studies. Relative to the Australian sample, the youngest age group were younger and the middle age group older in the Danish sample, e.g. 71% versus 50% of the first age group were aged 11 years in the Danish and Australian sample respectively. The relatively low prevalence of emotional symptoms and conduct problems among the youngest age group and the larger observed discrepancies between age groups in the Danish sample, may be partly attributable to the relatively younger age of the youngest group.

There might be differences in the perception of questions on school connectedness and mental health in different cultures (Herrman, Sexena, & Moodie, 2005). In this comparative study we have used the same SDQ sub-scales to measure emotional symptoms and conduct problems. However, Goodman et al. (2012) state considerable caution is required when interpreting cross-cultural comparisons of mental health, particularly when these rely on brief questionnaires. Furthermore, the analyses showed lack of measurement invariance between the two samples for these scales, indicating cultural differences in responses to the items (Heiervang, Goodman, & Goodman, 2008). Hence, scores on the emotional symptoms and conduct problems cannot be compared directly between the two countries and we have avoided doing so.

An important limitation of our study is the comparison of similar but not identical measures of school connectedness in the Danish and Australian studies. Although the three items were chosen and matched conceptually to be as similar as possible, some discrepancies exist, e.g. more of a focus on peers and classmates in the first Australian item and on the school as an institution or structure in the life of young person in the corresponding Danish item. Despite these differences in item wording and based on conceptual considerations, the measures were considered to be similar enough to explore trends and age group differences in school connectedness in the two countries. However, as with the mental health outcomes, we have been cautious not to compare the prevalence rates of low school connectedness in the Australian and Danish samples.

School-based surveys provide an inexpensive method of obtaining large samples of children and adolescents with high response rates (Bjertness et al., 2010). The included samples in this study had relatively high student response rates (85% in the Australian survey and 90% in the Danish survey). There might be several reasons for non-participation: the students may not be present in school on the day of data collection due to illness, truancy or vacation, or they may be attending special needs education. Unfortunately, the reasons for non-participation are not known. Further, as students were anonymous in both surveys, we have no information on non-participants. In terms of selection bias, adolescents with low school connectedness or experiencing emotional symptoms or conduct problems might be more likely to be absent from school and thus not be part of the surveys (Fröjd, Kaltiala-Heino, & Marttunen, 2011). If this is the case, we might have underestimated the prevalence of low school connectedness, emotional symptoms and conduct problems in both samples. However, the focus of this study is on the comparisons in prevalence between age groups, and these comparisons will be impacted if absence due to these factors was associated with age, e.g. if older students experiencing emotional symptoms were more likely not to attend school, the differences in prevalence between the age groups would be underestimated. As noted above, missing data may have resulted in samples biased toward students with higher school connectedness and fewer conduct problems. Regarding implications of this possible selection bias, it would likely only impact on the findings if greater underrepresentation of students with low school connectedness or experiencing emotional symptoms or conduct problems was present in one age group versus another. However, as the presence of missing data is not related to age, the association between missingness and school connectedness, emotional symptoms and conduct problems should not impact on the age comparisons in this study.

Unmeasured confounding may be an issue in this paper. Students' mental health could be affected by their parents' mental health as poor mental health of parents is a risk factor for poor mental health of children (Jané-Llopis et al., 2011; Villalong-Olives et al., 2013). However, none of the surveys measured mental health of parents. Connectedness to school is

related to connectedness to peers, family and neighbourhood, and these forms of connectedness could also be highly relevant when studying differences across school systems and countries (Villalong-Olives et al., 2013; Viner et al., 2012; WHO, 2014). Unfortunately, it was not possible to include these aspects of connectedness in this study.

4.3. Implications

This study has several implications for research. The trends in mental health and connectedness to school observed in these two studies need to be replicated in other representative national studies within each country. It would also be advantageous to conduct cross-national surveys, utilising tools which are measurement invariant across cultures, to study how these outcomes differ across countries with different school systems. An exploration of cultural understandings of connectedness to school using a qualitative approach would also be valuable.

Regarding implications for practice, the results of this study call for a continuation of efforts to support students through transition and to sustain efforts beyond the transition year in the Australian system, and for a stronger focus on adolescents' mental health and connectedness to school in the Danish school system. Often initiatives to promote mental health are focused on the youngest age groups (and the transition year in Australia) and fade when youth become older because of a stricter focus on academic learning, tests and exams. The implementation of whole school approaches are recommended across all school systems, given the growing evidence that these approaches promote student well-being (Weare and Nind, 2011).

5. Conclusion

This study's findings showed no statistically significant age group differences in low school connectedness, emotional symptoms or conduct problems among Australian students. In Denmark, there was an increase in low school connectedness, emotional symptoms and conduct problems as the students grew older. One possible explanation is that Australian schools have invested in providing support to students as they move to secondary schools and thus have a school system that is more adapted towards the needs of older students. In contrast, the Danish school system does not have a special focus on strengthening or promoting school connectedness among the oldest students. A continuation of efforts to support students through transition and beyond in the Australian system, and a stronger focus on adolescents' mental health and school connectedness to school in the Danish school system is required to ensure student well-being.

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